REMARKS

Claims 1-57 are currently pending in the application. Claims 1-57 were rejected. Claims 1, 3, 4, 8, 10, 41 and 52-57 have been amended. Claim 7 has been canceled without prejudice. Claim 58 has been added. No new matter is introduced by any of these amendments.

The Examiner objected to the Title of the Invention as not being descriptive relative to earlier filed, copending applications. The Title of the Invention has been amended and the objection is believed addressed thereby.

The Examiner provisionally rejected claims 1-57 under the judicially created doctrine of obviousness-type double patenting over the claims of commonly assigned, copending U.S. Patent Application No. 09/669,069. Because the present application is commonly owned with this copending application, a terminal disclaimer in compliance with 37 C.F.R. 1.321(c) has been filed herewith. The provisional rejection is believed obviated thereby.

The Examiner rejected claims 26-30 and 32-36 under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The Applicants respectfully disagree.

Claim 1 of the present application recites "[a]t least one computer-readable medium having computer program instructions stored therein for effecting multi-band processing of an original sampled signal." As would be apparent to one of skill in the art of digital signal processing, such computer program instructions may be employed by any system or device having suitable computing or data processing capabilities to effect the recited functionalities. Examples of such systems include a generalized computing system as well as the systems recited in claims 26-30 and 32-36 of the present application. That is, once presented with the computer program instructions recited in claim 1, one of skill in the art would understand how to incorporate such instructions into the operation of any of these systems. Indeed, incorporation of the present invention into any system with suitable processing capabilities would be straightforward.

In rejecting claims 26-30 and 32-36 under section 112, the Examiner has ignored the explicit language of the statute in favor of a test for enablement which simply does not apply in this situation. The first paragraph of 35 U.S.C. 112 provides the specification of a patent application "shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same." Thus, even if a system employing the computer program instructions of the present invention "can be implemented in a number of ways using a variety of different elements," a claim reciting such a system may still be enabled, as long as "one skilled in the art" would understand how "to make and use the same."

The test employed by the Examiner may be applicable in situations in which it is not straightforward to implement claimed functionality. However, given the ease with which one skilled in the art could incorporate the computer program instructions and their functionality into any given data processing system (and particularly those recited in claims 26-30 and 32-36), the standard of 35 U.S.C. 112, first paragraph, is clearly met. In view of the foregoing, the rejection of claims 26-30 and 32-36 should be withdrawn.

The Examiner rejected claims 1-6, 20, 21 and 25-40 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,097,824 (Lindemann). The Examiner also rejected claims 7-9, 12-19, 22-24 and 41-57 as being unpatentable over Lindemann in view of U.S. Patent No. 5,524,148 (Allen). Finally, the Examiner rejected claims 10 and 11 as being unpatentable over Lindemann and Allen and further in view of U.S. Patent No. 6,044,162 (Mead). Claims 1, 41 and 52-57 have been amended and the rejections are believed overcome thereby.

Each of the independent claims of the present application has been amended to include a limitation which distinguishes it from the art cited by the Examiner. For example, claim 1 has been amended to recite that "controlling the dynamic range for each signal component includes

dynamically adjusting a gain factor after applying the gain factor to a current sample of the signal component and in response to comparison of the current sample to a threshold level." Similar amendments have been made to claims 41 and 52-57. Support for these amendments is provided in the present application beginning at page 11, line 15, which describes operation of the automatic gain control (AGC) block 48 of Fig. 1b. It is clear from the description that the gain factor is adjusted only *after* applying the current gain factor to a current sample and then comparing the current sample to a threshold. In other words, adjustments to the gain factor are only made after provisionally applying the current value of the gain factor to the current sample.

By contrast, the dynamic range compression gain calculation and application described in Lindemann (at col. 5, lines 40-46 and in the Appendix) employs a "feed forward" approach to gain control rather than a "feed back" approach such as that employed by the various embodiments of the present invention. The feed forward aspect of Lindemann's algorithm is clearly illustrated in Fig. 1 of that patent in which the output of each band pass filter is received by a power estimator which integrates the signal to generate a power estimate which it passes to a gain calculation block. The gain calculation block generates a time varying gain from the power estimate in the logarithmic domain (e.g., see page 22 of the Appendix). The gain from the gain calculation block is applied to the output of the band pass filter from which it was derived in real time. It should be noted that the other references cited by the Examiner (e.g., Allen and Mead) are also characterized by this type of feed forward approach.

The approach taken by the embodiments of the present invention has significant advantages to the approaches taken by Lindemann, Allen and Mead, particularly for digital implementations. For example, the necessity for calculating power estimates and logarithmic gain functions, very expensive operations in the digital domain, is eliminated using the approach of the present invention. Secondly, a low pass filter is not required to get the effect of averaging the power in that the effective power averaging occurs in embodiments of the present invention

by the manner in which the rate of adjustment of the gain factor is controlled (e.g., the attack and release rates). Third, the present invention allows significant flexibility as to the scheduling of gain factor adjustments. That is, both positive and negative adjustments to the gain factor do not need to occur for every sample. Rather they can be scheduled to occur for every block of N (e.g., 64) samples, a clear efficiency advantage. Finally, infrequent scheduling of positive adjustments to the gain factor allows the use of much lower precision arithmetic to effect such adjustments, another clear advantage for digital implementations.

In view of the differences between the amended claims and the art cited by the Examiner, and in view of the significant advantages associated with the claimed invention, the Applicants respectfully request that all of the rejections involving Lindemann be withdrawn.

In view of the foregoing, Applicants believe all claims now pending in this application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested. If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at (510) 843-6200.

Respectfully submitted,
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